

**API2540 Liquid Volume Correction User Program
(ROC300-Series and FloBoss™ 407 Flow Managers)
(ROCLINK™ for DOS Configuration Software)**

**User Manual
(QER 03Q008)**

**Form A6138
May 2004**

Revision Tracking Sheet

May 2004

This manual may be revised from time to time to incorporate new or updated information. The revision level of each page is indicated at the bottom of the page opposite of the page number. A change in revision level to any page also changes the date of the manual that appears on the front cover. Listed below is the revision level of each page.

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1 GETTING STARTED

1.1 Scope of this Manual

This document serves as a user manual for the API2540 Liquid Volume Correction User Program (QER 03Q008), intended for use with the ROC300-series of Remote Operation Controllers (ROCs) with a FlashPAC, version 2.12 or greater, and FloBoss™ 407 Flow Manager, version 1.08 or greater. This manual describes how to download, configure, and monitor the program. The user program is accessed using ROCLINK™ for DOS configuration software version 2.23. The configuration software uses an IBM-compatible computer and Windows® Operating System. For information on use of the API2540 program with ROCLINK 800 configuration software, refer to user manual Form A6167.

1.2 Organization of this Manual

In this manual, the sections are arranged to provide information in the order in which it is required for first-time users. Once you become familiar with the procedures, and the software is running in a ROC or FloBoss 407, use the manual as a reference tool.

The manual is organized into the following major sections:

Section 1	Getting Started
Section 2	Installing the User Program
Section 3	Configuring the User Program
Appendix A	Standards
Appendix B	Domain Violations
Appendix C	Engineering Units

This manual assumes that the user is familiar with the ROC300-series and FloBoss 407 units and their configuration. For additional information, refer to the:

- ◆ *Type ROC306/ROC312 Remote Operations Controller Instruction Manual* (Form A4630).
- ◆ *Type ROC364 Remote Operations Controller Instruction Manual* (Form A4193).
- ◆ *FloBoss 407 Flow Manager Instruction Manual* (Form A6013).
- ◆ *RL101 ROCLINK Configuration Software User Manual* (Form A6051).

❖ **NOTE:** “ROC” is used in this manual to stand for all ROC and FloBoss devices.

1.3 API2540 Liquid Volume Correction User Program Overview

The Liquid Correction Program is designed for the ROC300-series units equipped with FlashPACs and the FloBoss 407. The Liquid Correction Program corrects the measured flow of crude oils, oil generalized products, LPG, and water by converting values to standard temperature and pressure levels. The Liquid Correction Program monitors the current flow rate, temperature, and pressure, and to calculate a corrected flow value for standard conditions based upon density value, sediment, and water percent value, vapor pressure, and the meter slippage factor.

API2540 Liquid Volume Correction User Program

The Liquid Correction Program accumulates the volume of the flowing fluid and can be configured to perform calculations for up to three different flows in the ROC306 and ROC312, five flows in the ROC364, or four flows in the FloBoss 407.

The Liquid Correction Program tracks two accumulated volumes for each flow. One accumulation is the volume since contract hour or last manual reset and the second accumulation is a running total that rolls over at 9,999,999. At contract hour or manual reset, flow and minutes today are transferred to flow and minutes yesterday.

The Liquid Correction Program supports the following liquids:

- ◆ Crude oil.
- ◆ Generalized oil products (jet fuel, diesel, oil, and gasoline).
- ◆ LPG (Liquefied Petroleum Gas).
- ◆ Water.

The Liquid Correction Program supports the following standards:

- ◆ API2540 Tables 5A, 5B, 6A, 6B, 34, 53, 53A, 53B, 54, API21, API5, AGA3/1992 and was developed according to API/ANSI/AGA standards. Refer to Appendix A for a list of all applicable standards.

The Liquid Correction Program supports the following types of inputs:

- ◆ Pulse (mass or volume).
- ◆ Analog Flow (mass or volume).
- ◆ Analog Differential Pressure (DP).
- ◆ Density.
- ◆ Vapor Pressure.
- ◆ Water and Sediments.

An uncorrected flow can be determined by one of the following inputs:

- ◆ Pulse Input (such as from a turbine).
- ◆ Analog Input (such as from a Vortex or MicroMotion).
- ◆ Differential Orifice Metering (flange taps only).

1.4 Domain Limitations Handling

The Liquid Correction Program application domain is limited, by API standards, to correcting the flow of densities, pressures, and temperatures within a custody transfer degree of accuracy. The domain borders vary according to the product class and parameter values. The calculation automatically adjusts the Liquid Type between LPG and Crude Oil if the input density fluxuates

Whenever a domain violation occurs, an error message displays and stored in the Event Log, with the ERR tag, the Domain Limit as “old value”, and the Current Value of the parameter. When the violation clears, “No Error” displays and a clear event is logged with the CLR tag. A real-time stamp is appended to each event. In error mode, calculations use the closest domain formulas.

❖ **NOTE:** Further interpretation of the volumes calculated and accumulated during domain violation periods is the user's sole responsibility.

Because domain limits for flowing pressure corrections and flowing temperature corrections overlap, the Liquid Correction Program assumes temperature-driven domain below 500 kPa (75 PSIA) and pressure-driven domain above 500 kPa. The associated error is less than 50 PPM.

1.5 Program Names and Versions

Program versions and names display in Table 1-1. **You must download two user programs.**

Table 1-1. Versions and Program Names

Program Name	User Task	User Point	Code Blocks	Data Blocks	ROC or FloBoss Version
api_3a.h00	3	28-29	C0000-CFFFF	A0000-ABFFF	ROC306/312/364 FlashPAC versions 2.12 and 2.20
apitbl3a.h00	3	28-29	C0000-CFFFF	A0000-ABFFF	ROC306/312/364 FlashPAC versions 2.12 and 2.20
api_3b.h00	3	28-29	D0000-DFFFF	B4000-BFFFF	ROC306/312/364 FlashPAC versions 2.12 and 2.20
apitbl3b.h00	3	28-29	D0000-DFFFF	B4000-BFFFF	ROC306/312/364 FlashPAC versions 2.12 and 2.20
api3a_ic.h00	3	28-29	A0000-AFFFF	B0000-BBFFF	ROC306/312 FlashPAC versions 2.12 and 2.20 for Industry Canada
ap3tblic.h00	3	28-29	A0000-AFFFF	B0000-BBFFF	ROC306/312 FlashPAC versions 2.12 and 2.20 for Industry Canada
api4a_ic.h00	3	28-29	60000-6FFFF	70000-7BFFF	FloBoss 407 version 1.08 for Industry Canada
ap4tblic.h00	3	28-29	60000-6FFFF	70000-7BFFF	FloBoss 407 version 1.08 for Industry Canada
api_4a.h00	3	28-29	C0000-CFFFF	74000-7FFF	FloBoss 407, version 1.08
apitbl4a.h00	3	28-29	C0000-CFFFF	74000-7FFF	FloBoss 407, version 1.08
api_4b.h00	3	28-29	B0000-BFFFF	60000-6BFFF	FloBoss 407, version 1.08
apitbl4b.h00	3	28-29	B0000-BFFFF	60000-6BFFF	FloBoss 407, version 1.08

2 INSTALLING THE USER PROGRAM

This section describes how to download and install the user program into the ROC306/312/364 with a FlashPAC (version 2.12 or greater) and FloBoss™ 407 Flow Manager (version 1.08 or greater), using ROCLINK for DOS Configuration Software (version 2.23). For additional information on downloading the program, checking memory allocation, and enabling the program, refer to the *RL101 ROCLINK Configuration Software User Manual* (Form A6051).

2.1 Customizing ROCLINK

ROCLINK for DOS requires several files to use the API2540 Liquid Volume Correction User Program:

1. **Navigate** to the **CD-ROM** directory where the gas flow calculation installation files are located. Program files are typically located in the Program Files/ROCLINK Files folder on the CD-ROM.
2. **Select** and **Copy** the following files:
 - ◆ menu3.txt
 - ◆ menu4.txt
 - ◆ scl_api1.tpl
 - ◆ scl_reg1.tpl
 - ◆ tllist.txt
3. **Paste** the **files** in to the ROCLINK default working directory.

The default directory is located at:

C : \ROCLINK

❖ **NOTE:** Select **Yes** if prompted to overwrite existing files.

4. **Right-mouse click** on the selected files.
5. Select **Properties**.

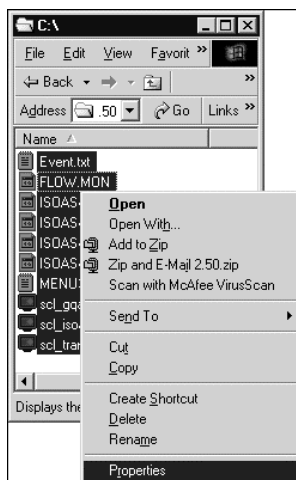


Figure 2-1. Properties

6. **De-select the Read-only Attribute** for each program file that has the Read-only Attribute set. If the files remain Read-only, ROCLINK will not connect to the ROC or FloBoss.

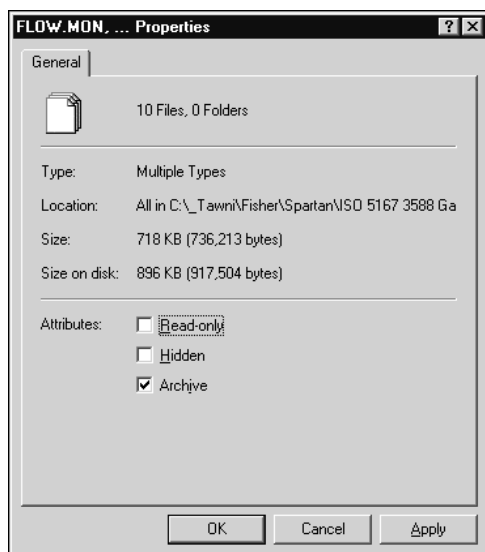


Figure 2-2. Attributes

7. Click **OK**.

❖ **NOTE:** Customize ROCLINK *before* downloading the user program.

2.2 Downloading the User Program

To download the user program:

1. **Connect** the ROC or FloBoss to your computer through the **LOI** port.
2. Launch and logon to **ROCLINK for DOS**.
3. Select **Utilities > User Programs**.



Figure 2-3. User Programs